REMARKS

In response to the Office Action dated August 4, 2004, Applicant respectfully requests reconsideration and withdrawal of the objection to the disclosure and rejection of the claims.

The abstract was objected to as containing superfluous language and legal phraseology. In response thereto, the abstract has been amended to overcome the bases for the objection.

Claim 1-15 were rejected under 35 U.S.C. §103, on the grounds that they were considered to be unpatentable over the *Abraham et al.* patent (U.S. 6,606,346). It is respectfully submitted, however, that the *Abraham et al.* patent does not disclose, nor otherwise suggest, the claimed subject matter to a person of ordinary skill in the art.

The *Abraham et al.* patent is directed to the correlation of a received GPS signal with a stored PRN code. Figures 6 and 7 of the patent contrast the prior art technique for determining such correlation, with the technique disclosed in the *Abraham et al.* patent. In the example of these figures, the individual samples of the received GPS signal are labeled A, B, C, D, E and F. The stored code samples that are to be compared with the received signal are labeled a, b, c, d, e and f. In the prior art technique illustrated in Figure 6, one cycle of the received signal, stored in a register 601, is compared against the entire length of the code, stored in register 602, to generate a first correlation result. Thereafter, the received signal is shifted by one sample, relative to the stored code, and a second correlation result 605 is computed. The process continues in this manner, until a correlation result has been

computed for each of the relative phase differences, i.e., time delays, between one cycle of the received signal and the stored code.

In the example illustrated in Figure 7, an entire cycle of the received signal is not compared to the stored code at any one time. Rather, at the first time instant (SHIFT 0), the first two samples of the received signal, 701, are successively compared to two samples of the stored code, 702, over three operating cycles to generate three partial correlation results 703a-c. The received signal is then shifted by one sample, and the procedure is repeated. The partial results from each iteration are then combined, as illustrated in Figure 7, to obtain full correlation results corresponding to those of Figure 6.

In contrast to this disclosed procedure, the present invention performs convolution within a vector processing system by buffering the data of one of the streams to be convolved into multiple chunks that form respective vectors, where the first bit of each chunk is aligned in the same position within its vector. Then, utilizing the power of the vector processor, a convolution sum is computed for each of the data chunks simultaneously, i.e., the vectors are processed in parallel.

It is respectfully submitted that the *Abraham et al.* patent does not disclose such a technique. With reference to Figure 7, it appears that the Office Action may be interpreting the signal samples stored in the register 701 as being multiple data chunks. However, the *Abraham et al.* patent does not teach that these data chunks are buffered, or stored, in a manner such that the first bit of each chunk is aligned in the same position within multiple respective vectors, and a convolution sum is computed on each data chunk simultaneously. Rather, in the system of the *Abraham et al.* patent, each "data chunk,", i.e. each sample pair, is processed

sequentially. In particular, sample pair A B is processed during SHIFT 0, sample pair FA is subsequently processed during SHIFT 1, and so on.

Conversely, if the segments 702 of the stored code are considered to be multiple data chunks, the patent also does not teach that convolution sums are computed on these data chunks simultaneously. Rather, each segment, e.g. a, b or c, d, is processed in a separate correlation operation. See column 10, line 63 to column 11, line 7.

The claimed invention is, in fact, contrary to the objectives of the *Abraham* patent. As noted at column 2, lines 51-52, the objective of the *Abraham* patent is to perform a correlation between a received GPS signal and a stored PRN code "in real time without storing unprocessed signal samples." The buffering of a data stream into multiple data chunks, as recited in claim 1, would run afoul of this objective. In the context of the present invention, the data is buffered to provide the ability to "look ahead", and thereby avoid a stall in the data processing operation. This ability to avoid stalls is significant when processing streaming data, such as audio or video information. The delays that are introduced by such buffering are contrary to *Abraham's* objective of real time processing.

For at least these reasons, therefore, it is respectfully submitted that the subject matter of claim 1 is not suggested by the *Abraham* patent. For the same reasons, the subject matter of claims 14 and 15, as well as new claim 16, is not suggested by the reference.

With respect to dependent claims 2-13, the Office Action states that the claimed features are obvious, but does not provide any support for this contention. It

is respectfully submitted that these features are not obvious from the teachings of the *Abraham* patent.

For example, claim 2 recites the step of storing the multiple vectors within a single matrix, and claim 3 further recites that the vectors comprise columns of the matrix. The *Abraham* patent does not contain any disclosure that suggests using a matrix to store the signal samples, nor to store them as column vectors that are operated upon simultaneously. Rather, as pointed out above, the storing of unprocessed signal samples is contrary to the real time objective of the *Abraham* patent.

Claims 6, 7, 9 and 10 recite that one of the data streams being convolved is a video or audio signal. The *Abraham* patent does not relate to the processing of audio or video signals. Rather, it is concerned with the correlation of a received GPS signal to a stored PRN code. The teachings of the *Abraham* patent have nothing to do with audio and video signal processing.

Claim 11 recites that one of the data streams comprises multiple elements, all having a value of 1. There is no apparent reason to employ such a data stream in the system of the *Abraham* patent. As noted above, that patent is concerned with the correlation between two code patterns that represent unique signatures for individual GPS satellites, to determine transmission delays. Utilizing a sequence consisting of all one's would not enable such a determination to be made.

For these additional reasons, therefore, it is respectfully submitted that the subject matter of these dependent claims is not obvious in light of the teachings of the *Abraham* patent.

Reconsideration and withdrawal of the rejection, and allowance of all pending claims are respectfully requested.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: _____
James A. LaBarre
Registration No. 28,632

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620